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10/561,309	03/13/2007	Steffen Scholze	DE02 0316 US	6536

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EXAMINER	
SHIKHMAN, MAX	

ART UNIT	PAPER NUMBER
2624	

NOTIFICATION DATE	DELIVERY MODE
09/15/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ip.department.us@nxp.com

Office Action Summary	Application No.	Applicant(s)	
	10/561,309	SCHOLZE, STEFFEN	
	Examiner	Art Unit	
	MAX SHIKHMAN	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12/19/2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1- 9* is/are rejected.

7)☒ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 December 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *12/19/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1-9 rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Spec is missing formulas to implement Gabor filters, filtering, tile rotation.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-7, 9 rejected under 35 U.S.C. 103(a) as being unpatentable over Hong "Fingerprint Image Enhancement: Algorithm and Performance Evaluation".

() **Regarding Claim 1**:

[NOTE: Gabor filters=P780 step 5. Gaussian=P783 col2. cosine function is superimposed=(18). divided into tiles=P780 blocks, "Divide G into blocks of size wxw". predominant direction=orientation. main direction= x_ϕ]

1. A method of filtering an image with bar-shaped structures by means of Gabor filters, which are formed in the spatial domain by a two-dimensional Gaussian bell-shaped curve on which a cosine function is superimposed in a main direction, (formula 18.)

characterized in that the image is divided into tiles, (blocks. P780 col2 step 1) that a predominant direction of the bar-shaped structures is determined for each tile and (P781 col1 "Estimate the local orientation of each block")

that one filtration takes place in the main direction (x_ϕ) and another filtration takes place at right angles (y_ϕ) to this, (Formula 18. P784 col1, "filter...orientation is ...local ridge orientation.")

Hong rotates the filter, (P784 col1, "filter...orientation is ...local ridge orientation.") while the Applicant rotates the tile.

Hong discloses everything as described above except,

the filtration is undertaken in such a way that one tile at a time is rotated until the predominant direction lies at right angles to the main direction of the Gabor filter, and that the filtered tile is rotated back again.

It would have been obvious to one of ordinary skill in the art at the time of the invention that rotating the directional filter in the direction of tile edges has the same effect to rotating the tile edges in the direction of the directional filter.

() **Regarding Claim 2**:

[NOTE: Gaussian=P783 col2. cosine function is superimposed=(18). tiles=P780 blocks, "Divide G into blocks of size wxw". predominant direction=orientation. main direction= x_ϕ]

2. A method as claimed in claim 1, characterized in that, tile by tile, for one of the filtrations,

a cosine oscillation [formulas (21)-(25)] with a frequency equal to the frequency of the structure at right angles to the predominant direction is derived, (p784 col1, "frequency characteristic of the filter, f, is completely determined by the local ridge frequency.")

and in that the cosine oscillation is modulated with a Gaussian bell-shaped curve.]Fig 9b. P783 Col2 "Gaussian envelope"]

() **Regarding Claim 3**:

[NOTE: Gaussian=P783 col2. tiles=P780 blocks, "Divide G into blocks of size wxw". Gaussian= P784 col1 "Gaussian envelope". predominant direction=orientation. main direction= x_ϕ]

3. A method as claimed in claim 1, characterized in that, tile by tile, for the other of the filtrations, the width (P784 col1 "standard deviations of the Gaussian envelope, $\delta x, \delta y$ ") of the Gaussian bell-shaped curve depends on the change in direction of the structures on the tile. (P784 col1, ridges, valleys)

() **Regarding Claim 4**:

4. A method as claimed in claim 2 characterized in that the width of the Gaussian bell-shaped curve (P784 col1 "standard deviations of the Gaussian envelope, $\delta x, \delta y$ ") in the

direction of the cosine oscillation is set to depend on the change in frequency on the tile. (formulas 14,15,24,25)

() **Regarding Claim 5**:

5. A method as claimed in claim 1 characterized in that selected angles, which are implemented in a particular program, are defined for the rotation, and then one of the defined angles that most closely accords with the rotation that is necessary per se is used for application of the filtration. (Hong rotates the filter, P784 col1, "filter...orientation is ...local ridge orientation." while the Applicant rotates the tile.)

() **Regarding Claim 6**:

6. A method as claimed in claim 1 characterized in that during the rotation, low-pass filtration (P781 col1) takes place through interpolation. (P782 Col2 "interpolation")

() **Regarding Claim 7**:

7. A method as claimed in claim 1 characterized in that binarization (P779 col1) takes place simultaneously during the back-rotation. (Hong rotates the filter, P784 col1, "filter...orientation is ...local ridge orientation." while the Applicant rotates the tile.)

() **Regarding Claim 9**:

9. A method as claimed in claim 1 characterized in that entries (values) lying below a threshold value and located at the edges of the one-dimensional filters are not taken into account during the filtration. (P783 col1, "remove the outliers")

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5. Claims 1,3 rejected under 35 U.S.C. 103(a) as being unpatentable over Yang "A modified Gabor filter design method for fingerprint image enhancement".

() **Regarding Claim 1**:

(Note: filter=TGF, MGF. bar-shaped structures=Fig 5)

1. A method of filtering an image with bar-shaped structures by means of Gabor filters, (TGF, MGF) which are formed in the spatial domain by a two-dimensional Gaussian bell-shaped curve (Fig 2,4) on which a cosine function is superimposed in a main direction, [(5)]

characterized in that the image is divided into tiles, (P1810 col2, "Divide the input fingerprint image into blocks of size WxW.")

that a predominant direction of the bar-shaped structures is determined for each tile [P1810 col2 formula (9)] that one filtration takes place in the main direction (x_ϕ) and another filtration takes place at right angles to this, (y_ϕ) (P1807 col2)

Yang discloses everything as described above except tile rotation,

and the filtration is undertaken in such a way that one tile at a time is rotated until the predominant direction lies at right angles to the main direction of the Gabor filter,

and that the filtered tile is rotated back again.

At the time of the invention, it would have been obvious to one of ordinary skill in the art at the time of the invention, to rotating the directional filter in the direction of tile edges can be accomplished by rotating the tile edges in the direction of the directional filter.

() **Regarding Claim 3**:

(Note: width=($\sigma x, \sigma y$). Gaussian bell-shaped curve=Fig 4)

3. A method as claimed in claim 1, characterized in that, tile by tile, for the other of the filtrations, (y_ϕ) (P1807 col2) the width ($\sigma x, \sigma y$) of the Gaussian bell-shaped curve (Fig 4)

depends on the change in direction [P1810 col2 formula (9)] of the structures on the tile. (P1810 col2 "ϕ of the TGF is chosen as the orientation of each block.")

Allowable Subject Matter

6. Claim 8 would be allowable if overcomes the rejection under 35 U.S.C. 112, first paragraph and rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. The following is a statement of reasons for the indication of allowable subject matter: The prior art does not disclose, "a larger tile that does overlap with the adjacent tiles and is of a size of at least double the root is formed, and, after the rotation, the larger tile is filtered in a square having a side length corresponding to at least double the root of the larger tile".

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MAX SHIKHMAN whose telephone number is (571)270-1669. The examiner can normally be reached on Monday-Friday 8:30AM-6:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, JINGGE WU can be reached on (571) 272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Max Shikhman/
Examiner, Art Unit 2624
9.3.2008

/Samir A. Ahmed/
Supervisory Patent Examiner, Art Unit 2624